Vantage Pro2™ Console Manual

For Vantage Pro2™ & Vantage Pro2 Plus™ Weather Stations

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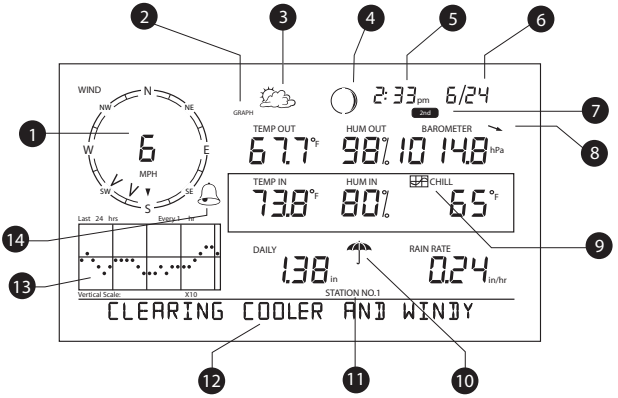
Vantage Pro2 Console Display Features



Display Features

1. Compass Rose
2. Graph & Hi/Low Mode Settings
3. Forecast Icons
4. Moon Phase Indicator
5. Time/Sunrise Time
6. Date/Sunset Date
7. 2ND Button Indicator
8. Barometric Trend Arrow
9. Graph Icon
10. Current Rain Icon
11. Station Number Indicator
12. Weather Ticker
13. Graph Field
14. Alarm Icon

FCC Part 15 Class B Registration Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modification not expressly approved in writing by Davis Instruments may void the warranty and void the user's authority to operate this equipment.
FCC ID: IR2DWW6312
IC: 378810-6312

EC EMC Compliance

This product complies with the essential protection requirements of the EC EMC Directive 2004/108/EC; Low Voltage Directive 2006/95/EC; and Eco-Design Directive 2005/32EC > .05 watt no-load adaptor.

Vantage Pro2 Console Manual

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Table of Contents

Welcome to Vantage Pro2™ 1
- Console Features 1
- Vantage Pro2 Options 2

Installing the Console 4
- Powering the Console 4
- Installing the AC Power Adapter 4
- Installing Batteries 5
- Connecting Cabled Stations 5
- Console Location 6

Using Your Weather Station 9
- Setup Mode 9
- Current Weather Mode 18
- Selecting Units of Measure 18
- Displaying the Forecast 24
- Displaying Time & Date or Sunrise & Sunset 24
- Calibrating, Setting, and Clearing Variables 25
- Highs and Lows Mode 27
- Alarm Mode 28
- Graph Mode 31

Troubleshooting and Maintenance 34
- Vantage Pro2 Troubleshooting Guide 34
- Console Diagnostic Mode 36
- Console Maintenance 40
- One Year Limited Warranty 40

Appendix A Weather Data 41

Appendix B Specifications 47
- Console Specifications 47
- Wireless Communication Specifications 47
- Console Data Display Specifications 48
- Weather Data Specifications 49

Appendix C Wireless Repeater Configuration 51

Vantage Pro2 Console Icons 53

Chapter 1
Welcome to Vantage Pro2™

Welcome to your Vantage Pro2 Weather Station console. The console displays and records your station's weather data, provides graph and alarm functions, and interfaces to a computer using our optional WeatherLink® software.
Vantage Pro2 stations are available in two basic versions: cabled and wireless. A cabled Vantage Pro2 station transmits outside sensor data from the Integrated Sensor Suite (ISS) to the console using a straight-through four-conductor cable. A wireless Vantage Pro2 station transmits outside sensor data from the ISS to the console via a low-power radio.

Note: Wireless consoles can also collect data from optional Vantage Pro2 sensors or a Davis Vantage Vue ISS, and can also retransmit data to other Vantage Pro2 or Vantage Vue consoles or a Davis Weather Envoy. You can have an unlimited number of consoles - one in each room!

The *Vantage Pro2 Quick Reference Guide* included with your station provides an easy to use reference for most console functions.

Console Features

Keyboard & Display

The keyboard lets you view current and historical data, set and clear alarms, change station models, enter calibration numbers, set up and view graphs, select sensors, and read the forecast. The keyboard consists of 12 command keys located next to the screen display and four navigation keys located below the command keys.
A weather variable or console command is printed on each command key. Just press a key to select the variable or function printed on that key.

Each command key also has a secondary function which is printed above the key on the console case. To select the secondary function, press and release 2ND (on the front of the console, upper right corner) and then immediately press the key for that function.

After pressing 2ND, the 2ND icon displays above the barometer reading on the screen for three seconds. All secondary key functions are enabled during this time. Keys resume normal operation after the icon disappears.
The+ and - navigation keys, along with < and > navigation keys are used to select command options, adjust values, and to provide additional functions when used in combination with a command key.

Console Modes

The console operates in five basic modes: Setup, Current Weather, Highs and Lows, Alarm, and Graph. Each mode lets you access a different set of console functions or display a different aspect of your weather data.

Vantage Pro2 Options

Optional Sensors & Transmitting Stations

Vantage Pro2 stations are extremely flexible. Use the following optional sensors and wireless stations to enhance the weather monitoring capabilities of your Vantage Pro2. See our web site for complete details: www.davisnet.com.

Optional Sensor and Stations	Description
Anemometer/Sensor Transmitter Kit (#6332)	Provides more flexible anemometer placement for wireless stations. With Envoy8X, allows additional solar radiation, UV, temperature, rain or 3rd party (reporting 0-3 volt) sensors.
Vantage Connect (#6620)	Transmits data from remote ISS to WeatherLink.com via cellular connection.
Wireless Leaf & Soil Moisture/ Temperature Station (#6345)	Measures and transmits leaf wetness, soil moisture and temperature data. Also for use with GLOBE.
Wireless Temperature Station (#6372)	Measures and transmits temperature data.
Wireless Temperature/Humidity Station (#6382)	Measures and transmits air temperature and humidity data.
Solar Radiation Sensor (#6450)	Measures solar radiation. Required for calculating evapotranspiration (ET). Available for cabled and wireless stations. Requires Sensor Mounting Shelf (#6673).
Ultraviolet (UV) Radiation Sensor (#6490)	Measures UV radiation. Required for calculating the UV dose. Available for Cabled and Wireless stations. Requires Sensor Mounting Shelf (#6673).

Note: Optional wireless stations can only be used with Wireless Vantage Pro2 Stations.

Optional WeatherLink® Software

The WeatherLink software and data logger connect your Vantage Pro2 station directly to a computer, providing enhanced weather monitoring capabilities, a continuous preserved data record, and powerful Internet features. The WeatherLink data logger fits neatly on the console and stores weather data even when the computer is turned off.

WeatherLink Option	Description
WeatherLink for Windows, USB connection (#6510USB)	Includes WeatherLink software and USB data logger. Allows you to save and view your weather data on your PC.
WeatherLink for Windows, serial connection (#6510SER)	Includes WeatherLink software and serial data logger. Allows you to save and view your weather data on your PC.
WeatherLink for Macintosh OS X, USB connection (#6520)	Includes WeatherLink software and USB data logger. Allows you to save and view your weather data on your Mac.

WeatherLink Option	Description
WeatherLinkIP for Windows XP/ Vista/7 (#6555)	Requires a broadband router with available Ethernet port. Allows you to post your weather data directly to your personal web page on WeatherLink.com without a PC. Among other features, allows you to receive e-mail alerts of current weather conditions or simple alarm conditions.
WeatherLink for APRS, Windows version, with streaming data logger, serial connection (#6540)	Includes WeatherLink software and streaming serial data logger. Allows real-time display of current weather conditions for use with APRS (Automatic Position Reporting System), for HAM radio users.
WeatherLink for Alarm Output, for Windows, with streaming data logger, serial connection (#6544)	Includes WeatherLink software and streaming serial data logger. Gives you the ability to control external devices based on various combinations of weather trends and events.
WeatherLink for Emergency Response teams, Windows version, with streaming data logger, serial connection (#6550)	Includes WeatherLink software and streaming serial data logger. Allows real-time display of current weather conditions for use by emergency response teams.
WeatherLink for Irrigation Control, Windows version, with streaming data logger, serial connection (#6560)	Includes WeatherLink software and streaming serial data logger. Allows intelligent and efficient control of popular automated irrigation systems using weather data.

Optional Accessories

Accessories are available from your dealer or may be ordered directly from Davis Instruments.

Envoys: Wireless Weather Envoy (#6316,) Envoy8X (#6318)

Performs many of the same functions as a Vantage Pro2 console, but without a display. Use an Envoy to interface your wireless station to a computer, freeing the display for use elsewhere. Weather Envoy can receive the same number and combinations of stations as a Vantage Pro2 console; Envoy8X can receive up to 8 stations in any combination and create a large database.

Sensor Mounting Shelf (#6673)

Required for mounting the optional Solar Radiation and/or UV sensors. The mounting shelf attaches to the base of the rain collector on the ISS.

Additional Vantage Pro2 (#6312) or Vantage Vue Console (#6351)

Enjoy weather information in several rooms.

USB-to-Serial (DB-9) Cable (#8434)

Allows the Serial version of WeatherLink (#6510SER, 6540, 6544, 6550, 6560) to connect to a USB port on your computer.

Telephone Modem Adapter (#6533)

Required when connecting station to an external phone modem.

Extension Cables (#7876)

Allows you to place the Cabled Vantage Pro2 ISS further away from the console using the extension cable provided by Davis Instruments. Maximum cable length is 1000’ feet (300 m).

- #7876-040 Cable, 40’ (12 m)
- #7876-100 Cable, 100’ (30 m)
- #7876-200 Cable, 200’ (61 m)

Chapter 2
Installing the Console

The Vantage Pro2 console is designed to give extremely accurate readings. As with any precision instrument, use care in its assembly and handling. Although installing the console is relatively simple, following the steps outlined in this chapter and assembling the Vantage Pro2 correctly from the start will help ensure that you enjoy all of its features with a minimum of time and effort.

Powering the Console

Cabled Vantage Pro2 Stations

Cabled Vantage Pro2 consoles supply power to the Integrated Sensor Suite (ISS) through the console cable. Because of the added power consumption of the ISS, the cabled console requires an AC power adapter used as the main power supply. The console batteries provide backup power for up to four to six weeks.

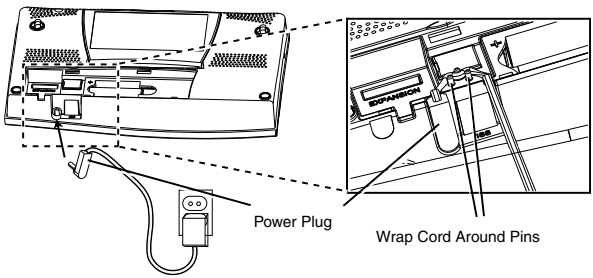
Wireless Vantage Pro2 Stations

Wireless Vantage Pro2 consoles do not require the use of an AC adapter. You may use the included adapter if you wish, but the three C-cell batteries should power a wireless console for up to nine months.

Note: When using an AC Power adapter, be sure to use the power adapter supplied with your Vantage Pro2 Console. Your console may be damaged by connecting the wrong power adapter. The console does not recharge the batteries. Because of this, and because NiCad batteries do not power the console as long as alkaline batteries, use alkaline batteries in the console.

Installing the AC Power Adapter

1. Remove the battery cover located on the back of the console by pressing down on the two latches at the top of the cover.
2. Find the power jack located on the bottom of the console case.



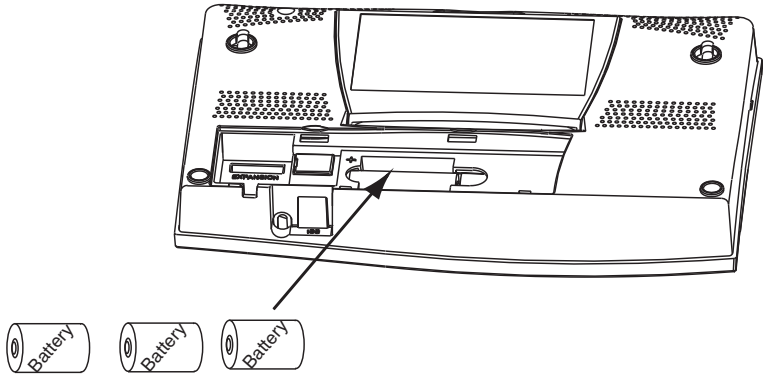
3. Insert the power adapter plug into the console power jack, then plug the other end of the adapter into an appropriate power outlet.

4. Check to make sure the console runs through a brief self-test procedure successfully. On power up, the console displays all the LCD segments and beeps twice. A message displays in the ticker banner at the bottom of the console, followed by the first screen that displays during Setup Mode. Press and hold DONE to skip the message and enter into Setup Mode.

   Setup Mode guides you through steps required to configure the station. See "Setup Mode" on page 9 for more information.

Installing Batteries

1. Remove the battery cover located on the back of the console by pressing down on the two latches at the top of the cover.

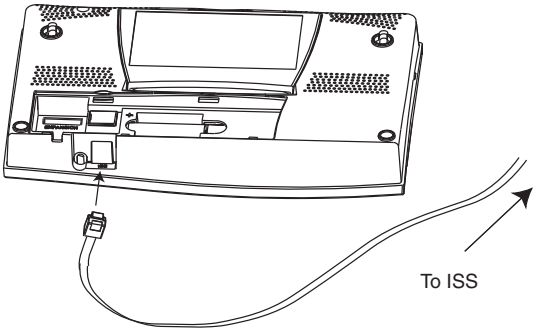


2. Insert three C batteries into the battery channel, negative (or flat) terminal first.
3. Replace the battery cover.

Connecting Cabled Stations

Cabled Vantage Pro2 stations come with 100 feet (30m) of cable. This cable is used for connecting the console to the ISS. Maximum cable length from ISS to the console using Davis Instruments cables is 1000 feet. To connect the console to the ISS:

1. Firmly insert the console end of the straight-through four-conductor wire into the console receptacle marked "ISS" until it clicks into place. Do not force the connector into the receptacle.



2. Ensure that the ISS cable is not twisted through the access port.

Note: The ISS must be assembled and connected to the console so that it is receiving power before the console connection can be tested.

Once the console and ISS are both powered up, cable connection should be tested and established.

Once the console is powered, it automatically enters Setup Mode. You can step through the Setup Mode options, or exit the Setup Mode to test the connection and sensor readings in Current Weather Mode. See “Setup Mode” on page 9 for Setup Mode options. See “Current Weather Mode” on page 18 for viewing and verifying current weather data coming from the cabled console.

To verify that the console is receiving data from the ISS through the console connection, see “Cabled ISS Assembly” in the *Integrated Sensor Suite Installation Manual*.

Console Location

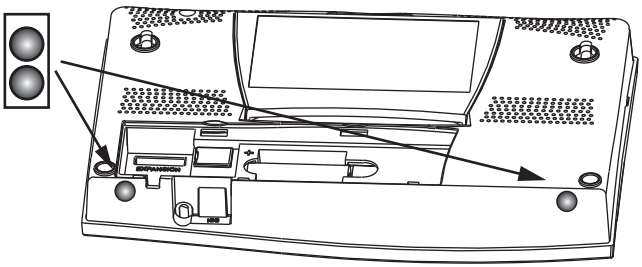
Place the console in a location where the keyboard is easily accessible and the display is easy to read. For more accurate readings:

- Avoid placing the console in direct sunlight. This may cause erroneous inside temperature and humidity readings and may damage the unit.
- Avoid placing the console near radiators or heating/air conditioning ducts.
- If you are mounting the console on a wall, choose an interior wall. Avoid exterior walls that tend to heat up or cool down depending on the weather.
- If you have a wireless console, be aware of possible interference from cordless phones or other devices. To prevent interference, maintain a distance of 10 feet between the Vantage Pro2 console and a cordless phone (handset and base).
- Avoid positioning a wireless console near large metallic appliances such as refrigerators, televisions, heaters, or air conditioners.
- The console antenna does not rotate in a complete circle. Avoid forcing the console antenna when rotating it.

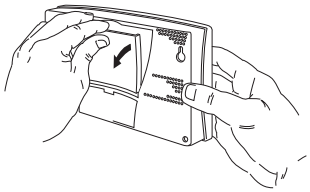
Table & Shelf Placement

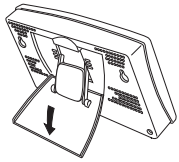
The console kickstand can be set to three different angles allowing five different display angles.

1. Install the two round rubber feet on the bottom of the console. The rubber feet help prevent damage to furniture and surfaces.

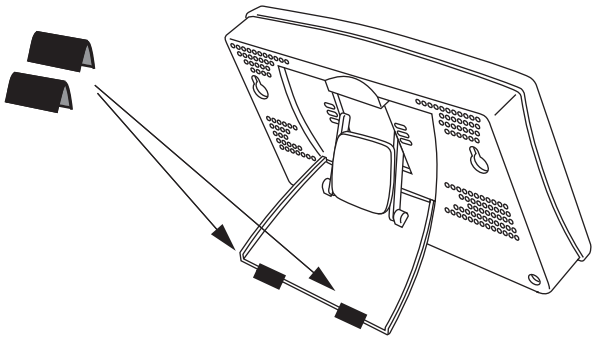


2. Lean the kickstand out by pulling on its top edge.
   You'll see the indentation for your finger at the top edge of the console.
3. Slide the catch to rest the kickstand in the appropriate angle.
   Choose low angles for display on a coffee table or other low area. Choose higher angles for display on a desk or shelf.





4. Install the two rubber channel feet on the kickstand.



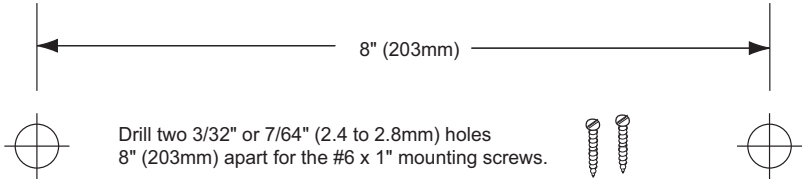
If necessary, pull up on the stand to close it. It will be a little tight, so it's okay to push hard enough to get it to slide.

Wall Mounting

The console mounts to the wall using two keyholes located on the back of the case.

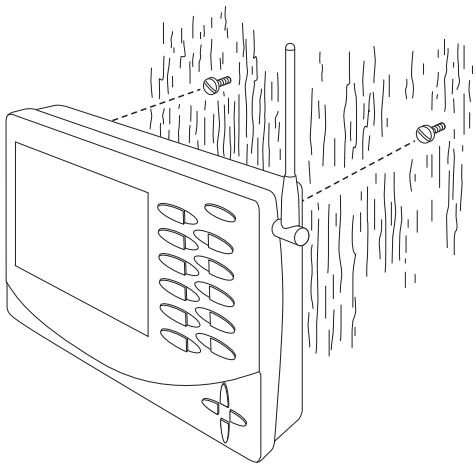
To mount the console on a wall:

1. Use a ruler to mark two mounting hole positions on the wall 8 inches (203 mm) apart.



This is a representation for the mounting hole positions. This template is not true to size.

   If installing a cabled Vantage Pro2 console with sensor cable running inside the wall, mount the console over an empty switch box.
2. Use a drill and a 3/32 or 7/64"(2.5 mm) drill bit to drill two pilot holes for the screws.
3. Using a screwdriver, drive the two #6 x 1" pan head self-threading screws into the wall. Leave at least 1/8" (3 mm) between the wall and the heads of the screws.
4. If the kickstand has been pulled out from the case, push it back into its upright and locked position.
5. Guide the two keyholes on the back of the console over the two screws.



Chapter 3
Using Your Weather Station

The console LCD screen and keyboard provide easy access to your weather information. The large LCD display shows current and past environmental conditions as well as a forecast of future conditions. The keyboard controls console functions for viewing current and historical weather information, setting and clearing alarms, changing stations types, viewing and/or changing station settings, setting up and viewing graphs, selecting sensors, getting the forecast, and so on.

Console Modes

The Vantage Pro2 console operates in five different modes:

Mode	Description
Setup	Use Setup Mode to enter the time, date, and other information required to calculate and display weather data.
Current Weather	Use Current Weather Mode to read the current weather information, change measurement units, and to set, clear or calibrate weather readings.
High/Low	High/Low Mode displays the daily, monthly or yearly high and low readings.
Alarm	Alarm Mode allows you to set, clear, and review alarm settings.
Graph	Graph Mode displays your weather data using over 100 different graphs.

Setup Mode

Setup Mode provides access to the station configuration settings that control how the station operates. Setup Mode consists of a series of screens for selecting console and weather station options. The screens that display in Setup Mode vary depending on the weather station type (cabled or wireless), or if the console has a WeatherLink connection already established. (See the *WeatherLink Getting Started Guide* for more information on connecting your console to your computer.)

Setup Mode Commands

Setup Mode displays when the console is first powered. This mode can be displayed at any time to change any of the console/weather station options. Use the following commands to enter, exit and navigate Setup Mode:

- Enter Setup Mode by pressing DONE and the - key at the same time.

Note: The console automatically enters Setup Mode when first powered.

- Press DONE to move to the next screen in the Setup Mode.
- Press BAR to display the previous screen in the Setup Mode.
- Exit Setup Mode by pressing and holding DONE until the Current Weather screen displays.

Screen 1: Active Transmitters

Screen 1 displays the message “Receiving from...” and shows the transmitters being received by the console. In addition, an “X” blinks in the lower right-hand corner of the screen every time the console receives a data packet from a station. The rest of the LCD screen is blank.

If you have a cabled station, or if your wireless ISS uses the factory settings and you are receiving the signal, the screen displays “Receiving from station No. 1.” Any optional stations that have been installed should also display.

Screen 1: Active Transmitters

Note: An ISS or optional station must be powered for the console to recognize it. Refer to the *Integrated Sensor Suite Installation Manual* or optional station installation instructions for more information. It make take several minutes for the console to acquire and display a Transmitter ID.

1. Make a note of the station number(s) listed on the screen.

Note: If a Vantage Pro2 or Vantage Vue ISS has been installed in your area, its ID number may also be displayed.

2. Press DONE to move to the next screen.

The console can receive signals from up to eight transmitters total, but there is a limit on the number of certain types of transmitters. The table below lists the maximum number of stations allowable for a receiver:

Station Type	Maximum Number
Integrated Sensor Suite (ISS)	1
Anemometer Transmitter Kit *(replaces ISS anemometer)*	1
Leaf & Soil Moisture/Temperature Station	2*
Temperature Station	8
Temperature/Humidity Station	8

Maximum Number of Transmitters in a Network with One Receiver

**Two are allowable only if both stations are only partially populated. For example, A network can either have both a Leaf Wetness/Temperature station and a Soil Moisture/Temperature station, or it can have one combined Leaf Wetness and Soil Moisture/Temperature station.*

Note: Listening to more than one transmitter may reduce battery life significantly.

Screen 2: Configuring Transmitter IDs — Wireless Only

(If you have a cabled station, press DONE and continue on to “Screen 4: Time & Date” on page 12.)

Setup screen 2 allows you to change the ISS transmitter ID and to add or remove optional transmitter stations. The default transmitter ID setting is “1” (ISS), which works fine for most installations.

Screen 2: Transmitter ID configuration

If you have a cabled station, or if you have a wireless station and are using the default transmitter ID setting, press DONE to move to the next screen.

Note: Typically, you can use the default transmitter ID setting of 1 unless you are installing one of the optional transmitter stations. However, if you are having trouble receiving your station, there may be another ISS with ID 1 operating nearby. Try changing the ID of both the console and ISS to another ID number.

3. Press the < and > keys to select the transmitter ID.

   When you select a transmitter ID, the ID number is displayed on the screen as well as the current configuration.
4. Press the + and - keys to toggle console reception of signals from transmitters using that ID on and off.
5. Press GRAPH to change the type of station assigned to each transmitter. Scroll through the station types - ISS, TEMP, HUM, TEMP HUM, WIND, RAIN, LEAF, SOIL, and LEAF/SOIL - until the correct type appears.
6. Press DONE to move to the next screen.

Note: This screen contains functionality for enabling repeaters. If the word “Repeater” displays in the right corner of the screen and you are not using repeaters as part of your network, see “Clearing Repeater ID” on page 52. If you are using repeaters as part of your network see “Wireless Repeater Configuration” (Appendix C) on page 51 for configuring repeaters on the console.

Screen 3: Retransmit — Wireless Only

If you have a cabled station, press DONE and go to “Screen 4: Time & Date” on page 12.

The console can retransmit the data it receives from the ISS to other Vantage Pro2 or Vantage Vue consoles using the retransmit feature. By toggling the feature on, the console becomes another transmitter that requires its own unique ID to transmit the data received from the ISS.

Screen 3: Retransmit

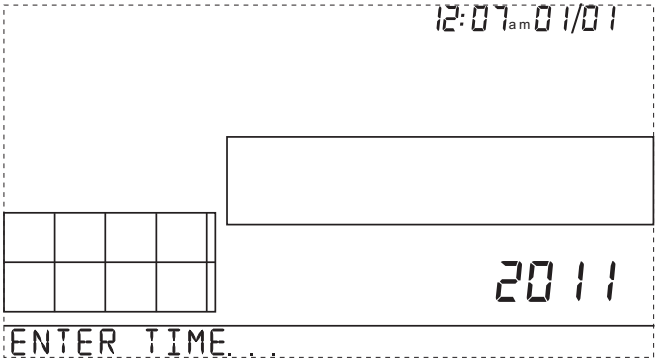
1. Press the + or - keys to turn the retransmit function on and off. The first available transmitter ID not used by the ISS or any optional sensor is automatically assigned. Data from the ISS is the only data that can be retransmitted by the console.

   When retransmit has already been enabled, pressing the < and > keys changes the Transmitter ID used for retransmit.
2. Use the > key to scroll through the list of available transmitter IDs and select the ID for your console.
3. Press DONE to move to the next screen.

Note: Make a note of the ID selected for retransmit. The console that receives the data from the console you have selected to retransmit should be configured to receive the transmitter ID you selected. See “Screen 2: Configuring Transmitter IDs — Wireless Only” on page 10 for more information.

Screen 4: Time & Date

The first time you power-up the console, enter the correct date and local time.



Screen 4: Time & Date

To change the time and date:

1. Press the < and > keys to select the hour, minute, month, day or year. The selected time or date setting blinks on and off.
2. To change a setting, press the + and - keys to adjust the value up or down.

   To choose a 12-hour (default in US models) or 24-hour clock (default in EU and UK models), first select either the hour or minute setting, then press 2ND and immediately press UNITS**.** This toggles the clock setting between the two clock types.

   To choose between a MM/DD (default in US models) or DD.MM (default in EU and UK models) display for the date, first select either the day or month setting, then press 2ND and immediately press UNITS**.** This switches the console from one date display to the other.
3. Press DONE to move to the next screen.

Screen 5 and Screen 6: Latitude and Longitude

The console uses latitude and longitude to determine your location, allowing it to adjust the forecast and calculate the times for sunset and sunrise.

- Latitude measures distance north or south of the equator.
- Longitude measures distance east or west of the Prime Meridian, an imaginary line running north and south through Greenwich, England.

Note: You can find your latitude and longitude by searching the internet (for example: googlemaps.com, earth.google.com or earthtools.org). Many atlases and maps include latitude and longitude lines. You can also talk to the reference department of your local library, call your local airport, or search on the Internet.

The more accurate you are, the better; however, a reasonable estimate will work, too.

Screen 5: Latitude

1. Press the < and > keys to move between fields.
2. Press the + and - keys to change the settings up or down.
3. To select between SOUTH or NORTH, press 2ND and then UNITS.
4. Press DONE to move to the Longitude screen.

Screen 6: Longitude

1. Press the < and > keys to move between fields.
2. Press the + and - keys to change the settings up or down.
3. To select the East or West Hemisphere, press 2ND, then UNITS.
4. Press DONE to move to the next screen.

Screen 7: Time Zone

The console is pre-programmed with a combination of US time zones and the names of major cities representing time zones around the world. You can also configure your time zone using the Universal Time Coordinate (UTC) offset.

Screen 7: Time Zone

Note: UTC offset measures the difference between the time in any time zone and a standard time, set by convention as the time at the Royal Observatory in Greenwich, England. Hayward, California, the home of Davis Instruments, observes Pacific Standard Time. The UTC offset for Pacific Standard Time is -8:00, or eight hours behind Universal Time (UTC). When it's 7:00 pm (1900 hours) UTC, it's 19 - 8 = 1100 hours, or 11:00 am in Hayward in winter. When daylight saving time is observed, an hour is added to the offset time automatically. Use this function in correlation with Screen 8, Daylight Saving Settings.

1. Press the + and - keys to cycle through time zones.
2. If your time zone is not shown, press 2ND then press the + and - keys to set your UTC offset.
3. Press DONE to select the time zone or UTC offset shown on the screen and move to the next screen.

Screen 8: Daylight Saving Settings

In most of North America (except Saskatchewan, Arizona, Hawaii, and the Mexican State of Sonora); and Europe use the AUTO daylight saving setting. The console is pre-programmed to use the correct starting and stopping dates for daylight saving time in these areas, based on the time zone setting in screen 7.

Stations located outside North America and Europe, or in areas that do not observe daylight saving time should use the MANUAL setting.

Screen 8: Daylight Saving Settings

1. Press the + and - keys to choose Auto or Manual.
2. Press DONE to move to the next screen.

Screen 9: Daylight Saving Status

Use this screen to either verify the correct automatic daylight saving status or to set daylight saving manually.

Screen 9: Daylight Saving Status

1. If Daylight Saving setting is MANUAL, you will have to set the time correctly when it changes. However, to maintain accurate calculations, you also need to use the + and - keys to turn daylight saving time on or off on the appropriate days of the year. If you have an AUTO daylight saving setting, the console displays the appropriate setting based on the current time and date.
2. Press DONE to move to the next screen.

Screen 10: Elevation

Meteorologists standardize barometric pressure data to sea level so that surface readings are comparable, whether they're taken on a mountainside or by the ocean. To make this same standardization and ensure consistent readings, enter your elevation in this screen.

Screen 10: Elevation

Note: If you do not know your elevation, there are several ways to find out. Many atlases and almanacs include elevation for cities and towns. You can also check with the reference department of your local library, or refer to internet resources. (See "Screen 5 and Screen 6: Latitude and Longitude" for a list of web sites.) The more accurate you are, the better; but a reasonable estimate works too.

1. Press the < and > keys to move from one numeral to another.
2. Press the + and - keys to adjust a numeral up or down.
3. To switch between feet and meters, press 2ND then press UNITS.
4. If you are below sea level, like in Death Valley or the Salton Sea, first enter the elevation as a positive number. Then, select the "0" immediately to the left of the left-most non-zero digit (the second zero from the left in 0026, for example, or the first zero from the left in 0207) and press the + and - keys to switch from a positive to negative elevation.

Note: You can only set the elevation to negative after you have entered a non-zero digit and when the zero in the position immediately to the left of the left-most non-zero digit has been selected.

5. Press DONE to move to the next screen.

Screen 11: Wind Cup Size

Vantage Pro2 stations come standard with large wind cups. Switch this setting to SMALL CUP if you have separately purchased and installed small wind cups. Switch to OTHER if you are receiving from a Vantage Vue ISS or are using a third-party anemometer.

Note: Large wind cups are more sensitive to low wind speeds and are the best choice for most users.

Screen 11: Wind Cup Size

1. Press the + and - keys to switch between the LARGE CUP, SMALL CUP, and OTHER wind cup settings.
2. Press DONE to move to the next screen.

Screen 12: Rain Collector

The tipping bucket in the Vantage Pro2 rain collector has been calibrated at the factory to measure 0.01"of rain with each tip for US models, or 0.2 mm of rain with each tip for UK and EU models. The typical user will not need to change this screen. However, some US users may want to install a metric adapter on their ISS so that it takes 0.2 mm readings for every tip of the bucket. If a metric adapter has been installed on your ISS, you should also calibrate your console for metric measurements using this screen.

Screen 12: Rain Collector Settings

Note: See the *Integrated Sensor Suite Installation Manual* for instructions on installing the metric rain adapter. The 0.1mm setting does not provide correct rain measurements with either the standard measurement or the metric adapter installed in the rain bucket and should not be used.

To calibrate your console for 0.2 mm measurements:

1. Press the + and - keys to display the 0.2 mm setting.
2. Press DONE to use the selected setting and move to the next screen.

If you calibrate your console for metric rain data in screen 12 of the Setup Mode, you will also need to set up your Current Weather Mode to display the metric readings. To display metric rain readings in the Current Weather Mode, once you have completed or exited the Setup Mode:

To Display Rain in Metric Units on the Console

1. Press RAINYR to display the current rain rate.

   Selecting Metric units for one rain variable also sets all the other rain variables to Metric units.
2. Press and release 2ND and press UNITS once.

   The units used to display rain data toggle between inches and millimeters each time you repeat this key sequence.

To Display Rain in Metric Units in WeatherLink

Refer to the *WeatherLink Online Help* for instructions to set the rain collector to 0.2 mm and to select millimeters as the unit for rain.

Screen 13: Rain Season

Because rainy seasons begin and end at different times in different parts of the world, you must specify the month you wish your yearly rain data to begin. January 1st is the default. The date the rain season begins affects yearly rain rate highs and lows.

Screen 13: Rain Season

1. Press the + and - keys to select the month for the start of the rainy season.
2. Press DONE to move to the next screen.

Note: This setting determines when the yearly rain total is reset to zero. Davis Instruments recommends a January rain season setting (the default), unless you reside in the west coast of the United States, the Mediterranean coast, experience dry winters in the Southern Hemisphere. If so, change the rain season setting to July 1st. If you are performing hydrology studies in any of these climates in the Northern Hemisphere, change the rain season setting to October 1st.

Screen 14: Serial Baud Rate

The Baud Rate screen displays only if the console detects that a WeatherLink data logger installed on the console.

The console uses a serial or USB port to communicate with a computer. If you are connecting the console directly to your computer via USB or Ethernet, leave the setting at 19200, the highest rate for the port. If you're using a modem, use the highest setting your modem can handle. The console must be equipped with a WeatherLink data logger to communicate with a computer or modem.

Screen 14: Baud Rate

Note: The baud rate setting on your console must match the baud rate of the software you are using. If you are using WeatherLink for Vantage Pro2, refer to WeatherLink help for instructions on setting the serial port baud rate on your computer.

1. Press the + and - keys to select the baud rate.

   Your Vantage Pro2 console supports baud rates of 1200, 2400, 4800, 9600, 14400, and 19200.
2. You have completed the console setup. To exit Setup Mode, press and hold DONE until the current weather screen appears.

Clear All Command

After you have completed the above setup procedures and have exited the Setup Mode, please use the Clear All command before putting your weather station into service.

The Clear All command clears all stored high and low weather data including monthly and yearly highs and lows and clears the alarm settings. The command is recommended to properly clear the console of any erroneous data before first putting the station into use.

1. Make sure wind speed is showing in the wind compass. If wind direction is showing, press WIND on the console until wind speed appears.
2. Press 2ND, then press and hold CLEAR for at least six seconds.
3. Release CLEAR when you see "CLEARING NOW" displayed at the bottom of the console's screen.

Current Weather Mode

In the Current Weather Mode you can display the current data readings from your station, select units of measure, and calibrate, set, or clear weather variables. You can see up to ten weather variables on the screen at the same time, as well as the time and date, the moon and forecast icons, a forecast or special message from your station, and a graph of the currently selected variable. A few variables are always visible on the console screen while most variables share their location with one or more variables. You can select any variable not currently on the screen to display it.

Selecting Weather Variables

Select a weather variable to display its data on the screen if it isn't already visible or to graph the data available for that variable.

Weather variables are selected via the console command keys:

- If the variable is printed on a key, just press the key to select the variable.
- If the variable is printed on the console housing, first press and release 2ND, then quickly press the key below the variable to select it.

Note: After pressing 2ND, the 2ND icon displays on the screen for three seconds. Command key secondary functions are enabled during this time. The keys return to normal operation after the icon disappears.

- Select a variable and press GRAPH to graph the variable in the Current Weather Mode screen. The console places a graph icon on the screen next to the selected variable or value you want to view to indicate the currently selected variable.

- You can also select any variable currently displayed on the LCD screen using the navigation keys. Push up (+) to move up the screen. Press down **(-)** to move down the screen. Push left (**<**) to move left and push right (**>**) to move right.

Selecting Units of Measure

Most weather variables may be displayed in at least two different measurement units, including imperial (US) and metric systems, although some variables feature more possibilities. Barometric pressure, for example, may be displayed in millibars, millimeters, inches, or hectoPascals. Note that you can set each variable's units independently, and at any time, as you like.

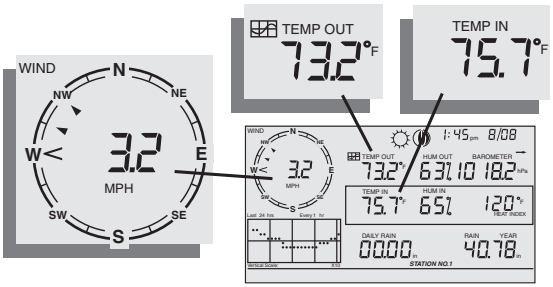
To change units:

1. Select the weather variable. See "Selecting Weather Variables" on page 18.
2. Press and release 2ND then press UNITS. The selected variable's units change. Repeat steps 1 and 2 until the desired units appear.

For example, to change the barometric pressure units, first select barometric pressure by pressing BAR. Next, press and release 2ND, then press UNITS. Repeating

these steps cycles through the units available for barometric pressure: millibars, millimeters, inches, and hectoPascals.

Displaying Units: Barometric Pressure Units: millibars (mb), millimeters (mm) and



Wind Direction, Outside and Inside Temperature

Wind Speed and Direction

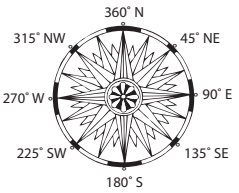
Press WIND to select wind speed.

3. Wind speed may be displayed in miles per hour (m.p.h.), kilometers per hour (km/h), meters per second (m/s), and knots (knots). The 10 minute average wind speed will be displayed in the ticker.

   A solid arrow within the compass rose indicates the current wind direction. Arrow caps indicate up to six different 10-minute dominant wind directions to provide a history of the dominant wind directions for the past hour.

4. Press WIND a second time to display the wind direction in degrees instead of the wind speed. When displayed in degrees, Due North displays as 360° for consoles with firmware dated May 2005 or later. Previous releases marked Due North at 0°.

   Each additional WIND key press toggles the display between wind speed and wind direction in degrees.



Note: If your anemometer arm is not pointing true north, you should recalibrate the wind direction reading on your console. See “Calibrate Wind Direction Reading” on page 25 for more information.

Outside and Inside Temperature

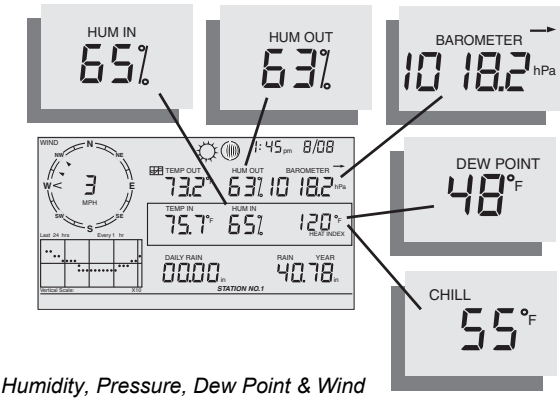
1. Press TEMP to select outside temperature.

Temperature may be displayed in degrees Fahrenheit (ºF) or Celsius (ºC). Temperatures can also be displayed in degrees or in tenths of a degree.

TEMP

2. Press TEMP again to select inside temperature.

   Each consecutive press of TEMP displays temperature readings for any optional temperature, temperature/humidity, soil temperature, soil moisture stations also connected to your console. The order of the optional sensors readings display depends on your station configuration. Temperatures for temperature stations display, with soil temperature and moisture stations displaying consecutively.



Humidity, Pressure, Dew Point & Wind

Humidity

DEW HUM

Press HUM to select outside humidity. Pressing HUM a second time selects inside humidity. Humidity is displayed in percent relative humidity. Each consecutive press of HUM displays humidity readings for any optional humidity, leaf wetness, and leaf temperature stations also connected to your console. The order of the optional sensors readings display depends on your station configuration. Humidity readings for humidity stations display, with leaf wetness and leaf temperature readings displaying consecutively.

Wind Chill

Press 2ND then press CHILL to select Wind Chill. Wind Chill is displayed in either Fahrenheit (ºF) or Celsius (ºC) in whole degrees.

2ND CHILL WIND

The console uses the ten-minute average wind speed to calculate wind chill.

Dew Point

Press 2ND then press DEW to select Dew Point. Dew Point is displayed in either Fahrenheit (ºF) or Celsius (ºC) in whole degrees.

2ND DEW HUM

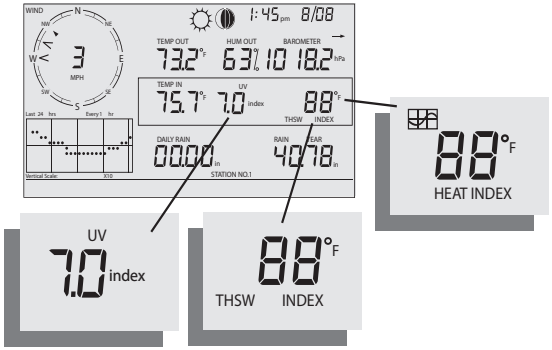
Barometric Pressure

BAR

Press BAR to select barometric pressure. Barometric pressure may be displayed in inches (in), millimeters (mm), millibars (mb) or hectoPascals (hPa).

Pressure Trend

The pressure trend arrow indicates the current barometric trend, measured over the last three hours. The pressure trend is updated every 15 minutes. The pressure trend requires three hours of data in order to be calculated so it won't display right away on a new station. The pressure trend is indicated on the console screen, as long as the required data is available.



UV, Heat, and THSW Index

UV (Ultraviolet Radiation)

2ND UV RAIN YR

Press 2ND and UV to display the current UV index. The current UV index is the amount of ultraviolet radiation the sensor is currently reading.

Press 2ND and UV again to display the accumulated UV index for the day. The accumulated UV index is the total ultraviolet radiation that the sensor has read throughout the day. The accumulated UV index for the day is reset to zero every night.

Note: Requires a UV sensor. See "Optional Sensors & Transmitting Stations" on page 2.

Heat Index

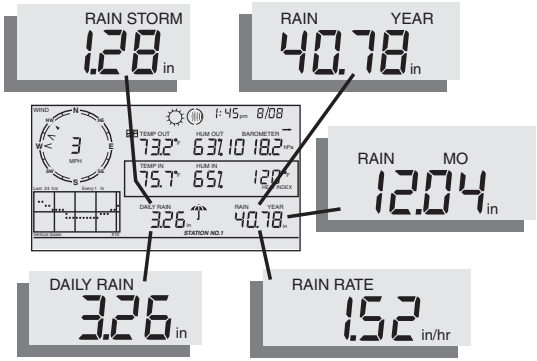
2ND HEAT TEMP

Press 2ND then press HEAT to display the Heat Index.

THSW Index

After you have selected the Heat Index, press 2ND then press HEAT again to select the Temperature Humidity Sun Wind (THSW) Index. The THSW Index is only available on stations equipped with a solar radiation sensor.

The Heat Index and the THSW Index display in the same place on the screen and are displayed in degrees Fahrenheit (ºF) or Celsius (ºC).



Daily Rain, Rain Storm, Rain Year, Rain Month, & Rain Rate

Rain Rate

Press RAINYR to display the current rain rate. Rain Rate may be displayed as either inches per hour (in/hr.) or millimeters per hour (mm/hr.). Rain Rate will show zero and the umbrella icon does not appear until two tips of the rain bucket within a 15–minute period.

UV
RAIN$_{YR}$

Month–to–date precipitation

Press RAINYR again to select the month–to–date precipitation record. Monthly rain displays the precipitation accumulated since the calendar month began. Month–to–date precipitation is displayed in inches or millimeters (mm).

Year–to–date precipitation

Press RAINYR a third time to display the year–to–date precipitation record. Yearly rain displays the precipitation accumulated since the 1st of the month you've chosen as the beginning of your rain season in Setup Mode (See "Screen 13: Rain Season" on page 16). Year–to–date precipitation is displayed in inches (in) or millimeters (mm).

Daily Rain

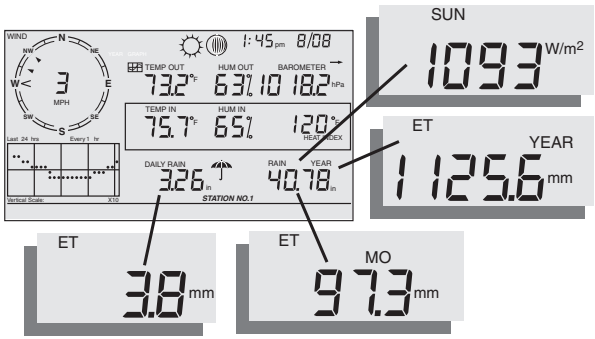
Press RAINDAY to display the rain accumulated since 12 midnight. Any rain accumulated in the last 24 hours displays in the ticker at the bottom of the screen.

RAIN$_{DAY}$

Rain Storm

Rain Storm displays the rain total of the last rain event. It takes two tips of the rain bucket to begin a storm event and 24 hours without rain to end a storm event.

Press RAINDAY to toggle between the daily rain total and the Rain Storm total. Rain accumulation may be displayed as either millimeters (mm) or inches (in).



Solar Radiation, Current ET, ET Month & ET Year

Solar Radiation

Press and release 2ND then press SOLAR to display the current solar radiation reading. Solar radiation is displayed as Watts per square meter (W/m^2).

2ND SOLAR RAIN DAY

Current Evapotranspiration (ET)

Press and release 2ND then press ET to display the current evapotranspiration reading.

2ND ET BAR

Monthly Evapotranspiration (ET)

Press 2ND then press ET, then repeat the key sequence to display Monthly ET.

Yearly Evapotranspiration (ET)

Press 2ND then press ET, then repeat this key sequence two more times to display the ET reading since January 1st of the current year.

Note: A solar radiation sensor is required to take readings listed above. See “Optional Sensors & Transmitting Stations” on page 2.

Lamps

Press 2ND then press LAMPS to turn on the backlight for the screen display. Press 2ND then LAMPS again to turn the backlight off.

LAMPS 2ND

Use the backlight when the LCD is not clearly visible. When the console is battery operated, the backlight remains on as long as keys are pressed or a ticker tape message is scrolling across the screen. If no keys are pressed, the backlight automatically turns off about fifteen seconds after it is turned on. If any key is pressed while it is turned on, it will stay illuminated for 60 seconds from the last key press. When battery power is low, the backlight does not light.

Note: When the console receives power from the AC adapter, the backlight remains on until it is toggled off. Leaving the backlight on raises the inside temperature reading and lowers the inside humidity reading.

Displaying the Forecast

Your console generates a weather forecast based on the barometric reading & trend, wind speed & direction, rainfall, temperature, humidity, latitude & longitude, and time of year. Included in the forecast is a prediction of the sky condition (sunny, cloudy, etc.) and changes in precipitation, temperature, wind direction or wind speed.

Press FORECAST to display the forecast. The forecast ticker message at the bottom of the screen predicts the weather up to 48 hours in advance.

The forecast is updated once an hour, on the hour. Predictions are made for cloud cover, temperature trends, the likelihood of precipitation, timing, severity and windy conditions.

Forecast Icons

The forecast icons show the predicted weather for the next 12 hours. If rain and/or snow is possible but not necessarily likely, the partly cloudy icon along with the rain or snow icon displays. When both the rain and snow icons display together, a chance of rain, freezing rain, sleet and/or snow is likely.

Displaying Time & Date or Sunrise & Sunset

Your console shows the sunrise and sunset time in the same place on the screen used by the current time and date. Press 2ND and then press TIME to toggle the screen between the current time and date or the sunrise and sunset times for the current day.

Note: See “Screen 4: Time & Date” on page 12 to change the console time and date or to select a 12- or 24-hour clock.

Calibrating, Setting, and Clearing Variables

To fine-tune your station, you can calibrate most of the weather variables. For example, if your outside temperature seems consistently too high or too low, you can enter an offset to correct the deviation.

Calibrating Temperature And Humidity

You can calibrate inside & outside temperature, inside & outside humidity, as well as any extra temperature/humidity sensor readings you have transmitting to your Vantage Pro2.

1. Select a variable to be calibrated. See "Selecting Weather Variables" on page 18.
2. Press and release 2ND, then press and hold SET.

   After a moment, the variable you've selected begins to blink. Keep holding SET until the Calibration Offset message displays in the ticker.

   The ticker displays the current calibration offset.
3. Press the+ and - keys to add or subtract from the temperature offset value.

   Inside and outside temperature are calibrated in 0.1° F or 0.1° C increments, up to a maximum offset of +12.7 (°F or °C) and a minimum offset of -12.8 (°F or °C). The variable will change value and the ticker will show the offset you've entered.
4. Press DONE to exit calibration.

Calibrate Wind Direction Reading

If the anemometer arm cannot be mounted pointing to true north, use this procedure to correct the wind direction console reading.

1. Check the current direction of the wind vane on the anemometer. Compare it to the wind direction reading on the console.
2. Press WIND as necessary to display the wind direction in degrees.
3. Press and release 2ND, then press and hold SET.
4. The wind direction variable will begin to blink.
5. Continue holding the key until the CAL message appears in the ticker. The ticker displays the current wind direction calibration value.
6. Press the < and > keys to select digits in the anemometer's current reading.
7. Press the + and - keys to add/subtract from the anemometer reading.
8. Repeat steps 6 and 7 until you have entered the offset value from Step 1.
9. Press DONE to exit calibration.

Calibrating Barometric Pressure

Before calibrating the barometric pressure, be sure the station is set to the correct elevation. See "Screen 10: Elevation" on page 14 for more information.

1. Press BAR to select barometric pressure.
2. Press and release 2ND, then press and hold SET.

   The pressure variable blinks.
3. Continue holding the key until the ticker reads "set barometer . . . ".
4. Press the < and > keys to select digits in the variable.
5. Press + and - keys to add to or subtract from the digit's value.

6. Press DONE to exit calibration.

Setting Weather Variables

You can set values for the following weather variables:

- **Daily Rain**—Sets the daily rain total. Monthly and yearly rain totals are updated.
- **Monthly Rain**—Sets the current months total rain. Does not affect yearly rain total.
- **Yearly Rain**—Sets the current year's rain total.
- **Daily ET (Evapotranspiration)**—Sets the daily ET total. Monthly and yearly ET totals are updated.
- **Monthly ET**—Sets the current month's ET. Does not affect yearly total.
- **Yearly ET**—Sets the current year's total ET.

To set a weather variable's value:

1. Select the variable you wish to change.
2. Press and release 2ND, then press and hold SET. The variable blinks.
3. Keep holding SET until all digits are lit and only one digit is blinking.
4. Press the < or > keys to select digits in the value.
5. Press the + and - keys to add to or subtract from the selected digit.
6. When you are finished, press DONE to exit.

Clearing Weather Variables

The following weather variables can be cleared:

- **Barometer**—Clears any pressure offset used to calibrate the station, and the elevation entry.
- **Wind**—Clears the wind direction calibration.
- **Daily rain**—Clearing the daily rain value is reflected in the daily rain total, the last 15 minutes of rain, the last three hours of rain sent to the forecast algorithm, the umbrella icon, and the monthly and yearly rain totals. Clear the daily rain total if the station accidentally recorded rain when the ISS was installed.
- **Monthly rain**—Clears the monthly rain total. Does not affect the yearly rain total.
- **Yearly rain**—Clears the yearly rain total.
- **Daily ET**—Clears daily ET and subtracts the old daily ET total from the monthly and yearly ET totals.
- **Monthly ET**—Clears the current monthly ET total. Does not affect the yearly ET total.
- **Yearly ET**—Clears the current yearly ET total.

To clear a single weather variable:

1. Select the weather variable.

   See "Selecting Weather Variables" on page 18.

2. Press and release 2ND, then press and hold CLEAR.

   The variable you've chosen blinks. Keep holding the key until the value changes to zero or, in the case of the barometer, the raw barometer value. Clearing the barometer value also clears the elevation setting.

Clear All Command

This command clears all stored high and low weather data including monthly and yearly highs and lows and clears alarm settings all at once.

1. Make sure wind speed is showing in the wind compass. If wind direction is showing, press WIND on the console until wind speed appears.
2. Press 2ND then press and hold CLEAR for at least six seconds.
3. Release CLEAR when “CLEARING NOW” displays at the bottom of the console’s screen.

Highs and Lows Mode

The Vantage Pro2 records highs and lows for many weather conditions over three different periods: days, months, and years. Except for Yearly Rainfall, all high and low registers are cleared automatically at the end of each period.

For example, daily highs are cleared at midnight, monthly highs are cleared at month–end midnight, yearly highs are cleared at year–end midnight. You may enter the month that you would like the Yearly Rainfall accumulation to clear. The Yearly Rainfall clears on the first day of the month you chosen. The Yearly High Rain rate clears using the same setting.

The following table lists the high and low modes for all the weather variables:

Weather Variable	High	Low	Day, Time & Date	Month	Year	Additional Information
Outside Temperature	Yes	Yes	Yes	Yes	Yes	
Inside Temperature	Yes	Yes	Yes	Yes	Yes*	
Outside Humidity	Yes	Yes	Yes	Yes	Yes*	
Inside Humidity	Yes	Yes	Yes	Yes	Yes*	
Barometer	Yes	Yes	Yes	Yes	Yes*	
Heat Index	Yes		Yes	Yes	Yes*	
Temp/Hum/Wind/Sun (THSW) Index	Yes		Yes	Yes	Yes*	requires solar radiation sensor
Wind Chill		Yes	Yes	Yes	Yes*	
Wind Speed	Yes		Yes	Yes	Yes	Includes direction
Rainfall Rate	Yes		Yes	Yes	Yes	
Daily Rain			Total	Total	Total	
UV Index	Yes		Yes	Yes**	Yes*	requires UV sensor
Solar Radiation	Yes		Yes	Yes**	Yes*	requires solar radiation sensor
Dew Point	Yes	Yes	Yes	Yes	Yes*	
Evapotranspiration			Total	Total	Total	requires solar radiation sensor
Soil Moisture	Yes	Yes	Yes	Yes**	Yes*	requires soil moisture sensor
Leaf Wetness	Yes	Yes	Yes	No	Yes*	requires leaf wetness sensor

* Only stores the yearly high for the current year.
** Only stores monthly high for the current month.

Weather Data Highs and Lows

Viewing Highs and Lows

1. Press HI/LOW to enter the Highs and Lows mode.

   The DAY and HIGHS icons light up and the station displays the highs for all visible fields.

2. Press the + and - keys to scroll between Day Highs, Day Lows, Month Highs, Month Lows, Year Highs and Year Lows.

   The HIGH or LOW icon, as well the DAY, MONTH or YEAR icon lights to display which High/Low screen you've selected.
3. Press the < and > keys to scroll back and forth through the last 24 values.

   Pressing the < key displays the previous day's highs. Each time you press the < key, the date moves back another day. The 24 dots in the graph field also represent each of the last 24 days, months, or years; the right-most dot is the present. As you move backward and forward the flashing dot changes to show what value you're looking at.
4. Use the console keys to select a different weather variable.

   The console's time displays time of the selected variable's high or low.
5. Press DONE to exit the Highs and Lows mode. The console screen switches to the Current Weather mode.

Alarm Mode

The Vantage Pro2 features more than 30 alarms that can be programmed to sound whenever a reading exceeds or drops below a set value. With the exception of barometric pressure and time, all alarms sound when a reading reaches the alarm threshold. For example, if the high outside temperature alarm is set at 65º F, the alarm sounds when the temperature rises to 65.0º F.

When an alarm condition exists, the audible alarm sounds, the alarm icon blinks repeatedly, and an alarm description appears in the ticker at the bottom of the screen. The alarm sounds for a maximum of two minutes if the console is battery-powered, but the icon continues to blink and the message stays in the ticker until you clear the alarm or the condition clears. If you're using the AC adapter, the alarm will continue sounding as long as the condition exists.

The alarm will sound again for each new alarm. If more than one alarm is active, the description for each active alarm cycles onto the screen every four seconds. A "+" symbol appears at the end of the alarm text if more than one alarm is tripped.

Low alarms work the same way. For example, if the wind chill threshold is set for 30ºF, the alarm condition begins when the wind chill drops to 30º and will continue until the wind chill rises above 30º.

Four Special Alarms

ET (Evapotranspiration)

ET is updated only once an hour, on the hour. If during a given hour the ET Value exceeds the alarm threshold, the ET alarm sounds at the end of that hour. This is true for daily, monthly, and yearly ET alarms. You must have the optional Solar Radiation Sensor to use this alarm. See "Evapotranspiration (ET)" on page 46. for a description of this variable.

Barometric Pressure

The Vantage Pro2 allows you to set two barometric pressure alarms: a "rise" alarm and a "fall" alarm. You may select any rate of change per three hours between 0.00 and 0.25 inches (6.35 mm) Hg, (8.5 mb, hPa); the alarm will sound if the rate of change (in either direction) exceeds the threshold you set. This alarm is updated every 15 minutes.

Time

The time alarm is a standard “alarm clock” alarm. It sounds for one minute at the set time. Make sure you choose AM or PM, if you’re in 12-hour mode.

UV Dose

The UV dose alarm sounds when the accumulated UV dose has exceeded the dose you set. The UV dose alarm does not arm unless the initial UV dose for the day has been reset. Once the UV dose alarm value is set, clear the accumulated UV dose. See “Clearing Weather Variables” on page 26.

Setting Alarms

1. Press ALARM to enter the Alarm Mode to view or set the high alarm thresholds. The screen displays the current high alarm thresholds. The ALARM and HIGHS icons also appear.
2. Press the < and > keys to select one of the variables displayed on the screen or use the console keys to select any weather variable. Also, press HI/LOW to display the toggle between the high and low alarm threshold settings.
3. Press 2ND then press ALARM to activate the currently selected weather variable.
4. Press the < and > keys to select digits in the threshold value.
5. Press the + and - keys to change the digit’s value up and down.
6. Press DONE to finish changing the alarm setting.
7. Repeat steps 3 through 6 to change additional alarm settings.
8. Press DONE to exit Alarm Mode.

Vantage Pro2 Station AlarmsVantage Pro2 Station Alarms

Variable	Alarms
Barometric Pressure Trend	Storm Warning - uses trend value falling rate Storm Clearing - uses trend value rising rate
Evapotranspiration	ET Alarm - uses total ET for the day
Humidity, Inside	High and Low
Humidity, Outside	High and Low
Dew Point	High and Low
Leaf Wetness	High and Low
Rain	Flash Flood Alarm - uses current 15 minute rainfall total 24 Hour Rain Alarm - uses current 24 hour rainfall total
Storm	Storm Alarm - uses current storm rainfall total
Rain Rate	High
Soil Moisture	High and Low
Solar Radiation	High
Inside Temperature	High and Low
Outside Temperature	High and Low
Extra Temperature	High and Low
Heat Index Temperature	High
THSW Index Temperature	High
Wind Chill Temperature	Low
UV Radiation Index	High
UV Radiation MED	High - uses the current total if variable has been reset
Wind Speed	High
Time & Date	Yes - the alarm sounds for 1 minute.

Setting the Time Alarm

1. Press ALARM to enter alarm mode.
   The ALARM and HIGHS icons appear.
2. Press 2ND, then press TIME, then press 2ND again**,** and then press ALARM.
   The time field begins blinking.
3. Press the < and > keys to select hours, minutes, or AM/PM.
4. Press + and - keys to change the digit's value up and down.
5. Press DONE to exit Alarm Mode.

Clearing Alarm Settings

1. Press ALARM to enter alarm mode.
   The ALARM and HIGHS icons appear.
2. Select the alarm setting you wish to clear.
3. Press 2ND, then press and hold CLEAR until the setting changes to all dashes.
   You have cleared the alarm setting.
4. Press DONE to exit Alarm Mode.

Note: To clear **all** alarms, enter Alarm mode (press and release the ALARM key), then press and hold the ALARM key until all the fields become dashed.

Silencing Alarms

1. Press DONE to silence an alarm when it sounds.

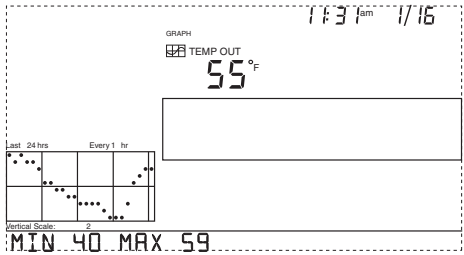
Graph Mode

The Vantage Pro2 console includes a powerful Graph Mode that allows you to view over 100 graphs of different kinds right on the screen, all without connecting to a personal computer.

Viewing Graphs

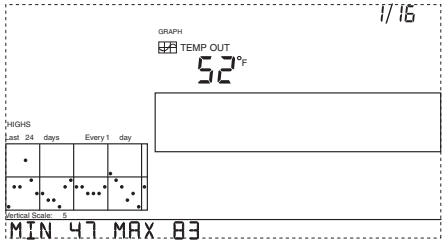
Although the graphs available may vary for each weather variable, you display the graphs in the same way.

1. Select a variable to graph.
   Only the date, graph, graph icon, and selected variable are visible. The rest of the screen is blank.
2. Press GRAPH to enter Graph Mode.
   Values for the each of the last 24 hours are displayed in the graph, each hour represented by a dot.
   The dot at right end of the graph is the value for the current hour. You'll notice that the dot is blinking.



3. Press the < key and the second dot from the right starts to blink.
   The screen displays the new dot's value. The time display shows what hour of the last 24 is being viewed.
4. Press the < and > keys to view the variable's values for each of the last 24 hours. The console also displays the maximum and minimum temperatures recorded in the last 24 hours.
5. Press the + and - keys to shift the graph's time span.

If you press the - key the graph shifts from the last 24 hours to the last 24 days. Now each dot represents the high recorded on the day shown in the date field. To see the lows recorded in the last 24 days, press HI/LOW. Press the < and > keys to move between days.



By pressing the - key again, the graph shifts to show the highs of the last 24 months. As before, use the < and > keys to move between months. Press HI/LOW to shift between the highs and lows.

By pressing the - key again, the graph shifts one more time to show the highs of the last 24 years. Press HI/LOW to shift between highs and lows.

The console beeps when you've reached the first or last possible value or time span for the graph. Since the console only graphs data collected by the station, the graphs can only show data collected since the station was first installed.

View graphs of all other variables the same way.

1. Select the variable you want to view.
2. Press GRAPH.
3. Use the < and > keys to select different variables.
4. Press the + key to shorten the time range.
5. Press the - key to lengthen the time range.
6. Press HI/LOW to shift between highs and lows.
7. Press DONE to exit.

Vantage Pro2 Console Graphs

Weather Variable	Available Graphs*							
	Current	1 Min	10 Min	15 Min	Hourly	Daily	Monthly	Yearly
Barometric Pressure	C	C			C	H, L	H, L	
Evapotranspiration (ET)**	T				T	T	T	T
Humidity, Inside	C				C	H, L	H, L	
Humidity, Outside	C				C	H, L	H, L	
Dew Point	C				C	H, L	H, L	
Leaf Wetness***	C				C	H, L		
Rain	T			T	T	T	T	T
Storm****								
Rain Rate	H	H			H	H	H	H
Soil Moisture	C				C	H, L		
Solar Radiation**	A				A	H		
Inside Temperature	C				C	H, L	H, L	
Outside Temperature	C				C	H, L	H, L	H, L
Heat Index Temperature	C				C	H	H	
Temp/Hum/Sun/Wind (THSW) Index**	C				C	H	H	
Wind Chill Temperature	L				L	L	L	
UV Radiation Index*****	A				A	H	C	
UV Radiation MED (Minimal Erythermal Dose)*****	T				T	T		
Wind Speed	A		A		A, H	H	H	H
Direction of High Wind Speed	Y					Y	Y	Y
Dominant Wind Direction	A				A	A	A	

* A = Average, H = Highs, L = Lows, T =Totals, Y = Yes, C = Current reading at the end of each period

** Requires solar radiation sensor, *****Requires UV sensor

*** Requires Wireless Leaf & Soil Moisture Temperature station

**** Graphs the last 24 storm events and doesn't follow the same graph conventions as other variables.

Chapter 4
Troubleshooting and Maintenance

Vantage Pro2 Troubleshooting Guide

While your Vantage Pro2 weather station is designed to provide years of trouble-free operation, occasional problems may arise. If you are having a problem with your station, please consult this troubleshooting guide before calling Davis technical support. You may be able to quickly solve the problem yourself. Please see "Contacting Davis Technical Support" on page 53.

Note: Refer to the ISS Installation Manual for additional troubleshooting information.

TABLE 4-1: TROUBLESHOOTING GUIDE

	Problem	Solution
Display	Display shows only "RECEIVING FROM....."	Indicates that console has rebooted. Hold the DONE key to return to Current Weather Mode. (Check time setting if power was lost.)
	Display is blank	Unit is not receiving power. Check the power adapter connections and/or replace batteries.
	Display shows dashes in place of weather data	• ISS not plugged in (cabled station). See ISS manual. • Sensors not transmitting (wireless station). See ISS (or other transmitter) manual. • Console not receiving (wireless station) - See "Troubleshooting Reception Problems" on page 35. • A reading has exceeded the limits indicated in the specifications table. • Calibration numbers may be causing readings to exceed display limits. Check calibration number and adjust if necessary.
	Console is sluggish or does not work at low temperatures	The console and display may not work below 32º F (0º C). Use an External Temperature sensor in low-temperature locations or install the console indoors.
	Display shows "odd" values or missing values.	You may have synchronized with another weather station nearby. Change the transmission and reception IDs to a different ID.
	Display "locks up"	Reset the console by removing AC and battery power then restoring power. If this occurs frequently in an AC-powered console, plug the AC power-adapter into a surge suppressor.
Humidity	Inside humidity seems too high or too low	Make sure the console is not near a humidifier or de-humidifier. Check calibration number and adjust if necessary. If inside humidity is low, and inside temperature is too high, see "inside temp" below. Also make sure the console backlight is not on.
Wind Speed	Wind speed reading seems too high or too low.	For low readings, remove wind cups and check for friction sources. Check the anemometer location. Is it sheltered from the wind? See ISS manual for additional wind speed troubleshooting information.
	Wind speed reads 0 either all the time or intermittently	The problem may be with the anemometer. Test anemometer by spinning wind cups. Check reed switch fields on diagnostic screen (see page 37) and call technical support.
Dew	Dew Point reading seems too high or too low	Check calibration numbers for temperature. Dew point depends on temperature and outside humidity. Make sure they're working.

TABLE 4-1: TROUBLESHOOTING GUIDE

	Problem	Solution
Temperature	Outside temperature sensor reading seems too high	Check to see if ISS is near mechanical or radiant heat source. Check calibration number and adjust if necessary. ISS or temp sensor may need to be relocated. See ISS or other transmitter manual.
	Inside temperature sensor reading seems too high	Move the console out of direct sunlight. Make sure that the console or sensor is not in contact with an exterior wall that heats up in sunlight or when outside temperature rises. Make sure the console or sensor is not near a heater or other internal heat source (lamps, appliances, etc.). Also make sure the console backlight is not on. Check calibration number and adjust if necessary.
	Outside temperature seems too low	Check calibration number and adjust if necessary. Sprinklers may be hitting the ISS radiation shield. Relocate. See ISS manual.
	Inside temperature sensor reading seems too low	Make sure the console or other temperature sensor is not in contact with an exterior wall that cools down when outside temperature drops. Make sure the console or other temperature sensor is not near an air conditioning vent. Check calibration number and adjust if necessary.
Wind Direction	Wind direction reading is dashed out	• Wireless model - check reception. See Reception Problems below. • Cabled model - cable may be faulty. If these steps do not reveal the problem, the anemometer may be faulty. Call technical support.
	Wind direction always says north	Usually a problem in the ISS, either with the transmitter or anemometer cable. See the ISS manual for troubleshooting information.
Chill	Wind chill reading seems too high or too low	Check calibration numbers for temperature. Wind chill depends on temperature and wind speed. Make sure they're working.
Heat	Heat Index reading seems too high or too low	Check calibration numbers for temperature. The heat index depends on temperature and outside humidity. Make sure the sensors are working.
Rain	No rain readings	Make sure cable-tie is removed from inside the rain collector. See the ISS manual.
UV/Solar	Readings are too high	Can be caused by high thin cirrus clouds.
Time	Incorrect times for sunrise and sunset	Check your latitude, longitude, time zone, and daylight savings time settings. Sunrise and sunset times are calculated from the console using all of these settings.

Troubleshooting Reception Problems

While we have tested the Wireless Vantage Pro2 radio extensively, each site and each installation presents its own issues and challenges. Obstructions, particularly metallic ones, often cut down your station's reception distance. Be sure to test reception between the console and ISS, in the locations you intend to install them, before permanently mounting your ISS or other transmitter(s).

The console's reception status displays at the lower right corner of the screen.

- An “X” flashes for every data packet received by the console.
- An “R” displays when the console is trying to re-establish a lost connection. The console tries for 10 minutes to re-establish a connection before going into L Mode.When no data packets have been received for 10 minutes, the console dashes-out any missing sensor readings.
- An “L” displays when the signal is lost (and the console is “asleep.”) The console stays in this mode for 15 minutes until returned to “R” mode. To force the console into “R” mode (“wake up” the console), enter and exit Setup Mode.

Check Console Reception

Enter Setup mode by pressing and holding DONE, then pressing the - key at the same time. Wait a few minutes while the console lists all the stations transmitting within range (See “Screen 1: Active Transmitters” on page 10 for more information). If the console does not detect your transmitter, check the following:

- Adjust the console and ISS antennas so that they are in line of sight with each other.
- Reduce the distance between the ISS and the console.
- If the console is directly beneath the ISS, the antennas should be horizontal.
- Try distancing your console from your ISS, at least 10 feet apart.
- Change the Transmitter ID (on both the console and the ISS) to a number other than 1.

Refer to the *ISS Installation Manual* or other station manual for instructions on how to check the station for potential transmission problems.

Console Diagnostic Mode

In addition to logging weather data, the console continuously monitors the station’s radio reception. You may find this information very helpful, especially when you are choosing locations for your console and ISS.

The Console Diagnostics Mode consists of two screens, the Statistical Diagnostic Screen and the Reception Diagnostic Screen. The Statistical Diagnostic screen applies for both cabled and wireless weather stations. The Reception Diagnostic screen applies only to wireless weather stations and is not accessible to a cabled weather station.

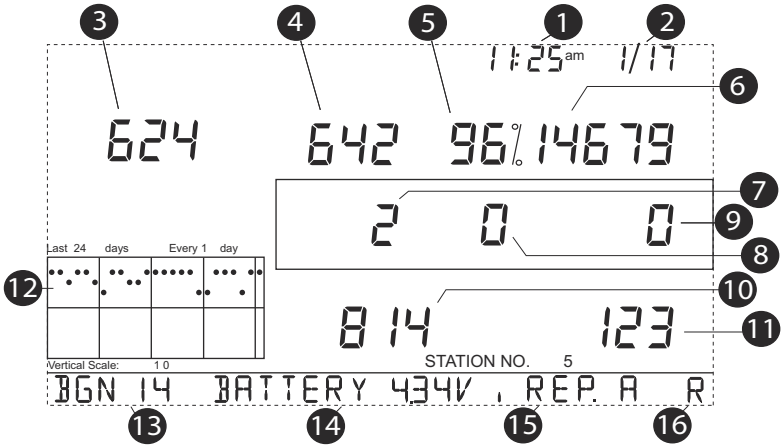
Note: Radio transmission data used by the diagnostic screens clears each day at midnight.

Diagnostic Screen Commands

- Press and hold TEMP, then press HUM to display the Statistical Diagnostic screen.
- Press the > key to display signal statistics for the next installed transmitter ID.
- Press 2ND and then press CHILL to toggle between the Statistical and Reception Diagnostic screens.
- A degree (°) sign displays in right corner of value 1 of the Reception Diagnostic screen (screen 2) to differentiate which screen is currently displayed.
- Press DONE to exit the diagnostic screen.

Screen 1: Statistical Diagnostic Screen

The Statistical Diagnostic displays information about how data is being received from the weather station to the console. The information that is displayed in this screen includes:



Screen 1: Statistical Diagnostics Screen

Note: All values with a * mark the value as being for Davis Instruments Internal use. All values with a ‡ mark values that are the same on both the Statistical and Reception Diagnostic screens.

1. Time of day or number of times the anemometer reed switch was seen closed*. The reed switch closes once each revolution of the anemometer wind cups. Press WIND to toggle between these two values.
2. Date or the number of times the anemometer reed switch was seen open*. Press WIND to toggle between these two values.

Note: The time and date displays can be toggled in both statistical and reception diagnostic screens.

3. Number of packets containing CRC errors received. The system runs a CRC check on data packets. Any data packets that don't pass this check are considered to contain errors and are discarded. These are considered bad packets.
4. The total number of bad data packets including missed packets and CRC errors. Missed packets are described as when a data packet is expected, but is not recognized as a data packet by the console.
5. Percentage of good packets received.
6. Total number of good packets received.
7. Number of times the console resynchronized with the transmitter. The console will attempt to resynchronize with the station after 20 consecutive bad packets.
8. Maximum number of bad packets in a row without resynchronization.
9. Current streak of consecutive bad packets. The counter increments when the console is synchronized but the packet is bad. This value is reset to zero when a good packet is received.

10. Longest streak of consecutive good packets received.
11. Current streak of consecutive good packets received.
12. Graph of the daily percentage of good data packets received over the last 24 days.
13. Background noise level. This refers to the undesirable signal level the console hears while it is in the process of acquiring a signal from a station. The range displayed is from 5 to 60. When the noise level is high, try to move the console closer to the station to get a stronger signal. Small background noise level does not always guarantee good reception. The signal strength between the station and the console needs to be stronger than the background noise level in order for the console to receive clearly. If there are reception problems while a small background noise level is still being displayed, make sure the console is within reasonable range of the station.

    If the console currently has acquired all the station signals it is set to receive, the background noise level displayed is the last noise level measurement taken before acquisition finished.
14. Current console battery voltage. Ignore this value if using the AC Adapter only to power the console.
15. Repeater ID currently communicating with the console. If a repeater or group of repeaters is used to relay station information to the console, the Repeater ID displayed is the repeater that the console is set to receive. If the console is not listening to repeaters, this section remains blank. Please see Application Note 25 available on the Davis Instruments Support web page for more information on using repeaters.

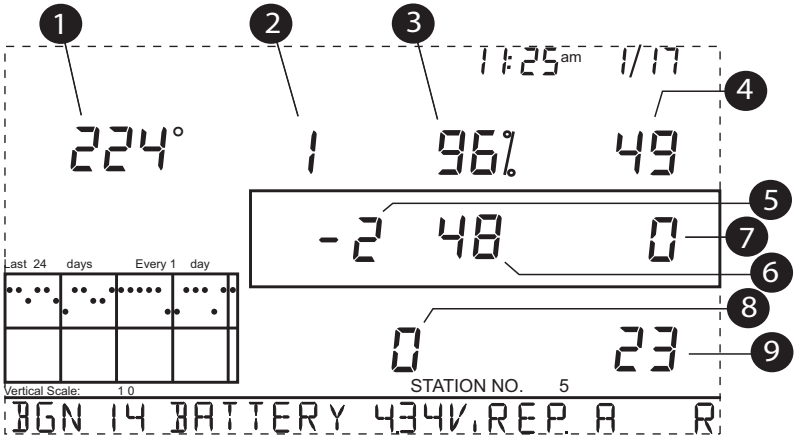
Note: The Repeater ID does not display in the ticker banner in firmware versions earlier than May 2005, or Version 1.6. If you want your console to support repeater communication, upgrade your console to the most recent console firmware version.

16. The console's reception status. See "Troubleshooting Reception Problems" on page 35 for information on the status types.

Screen 2: Reception Diagnostic Screen

The Reception Diagnostic screen displays information pertinent to the console's wireless reception. To view this screen from the Statistical Diagnostic screen, press 2ND and then press CHILL. The degree sign displaying in the upper left corner next to value 1 verifies that the Reception Diagnostic screen is currently displayed.

The information that is displayed in this screen includes:



Screen 2: Reception Diagnostics Screen

1. 8-bit timer value of next reception.*
2. Radio frequency error of the last packet received successfully. In normal operation, this value is +1, -1, or 0. This value affects the value of #5 on the next page.
3. Percentage of good data packets.‡
4. Signal strength of the last packet received. The values displayed in this field should generally be between 20 and 60. If a packet is not received successfully, the signal strength field is dashed out (--).
5. Current frequency correction factor. Shows the Automatic Frequency Control setting.
6. Frequency index of the next packet to be received.*
7. Current number of consecutive bad packets.‡
8. The number of times that the Phase Lock Loop did not lock.*
9. Current streak of consecutive good packets received.‡

Console Firmware Versions

In some cases, the problem may be that your console firmware doesn't support what you are trying to do. Use this command to determine the firmware revision level in your console. You can find more information on Vantage Pro2 console firmware versions and changes in the Weather Software Support section of our website. - for information.

Press and hold DONE then press the + key at the same time to display the console firmware version in the ticker at the bottom of the screen.

Console Maintenance

Changing Batteries

Use this procedure to change console batteries without losing any stored weather data or console configuration settings.

1. Plug in the AC adapter or, if the AC adapter is not present, enter Setup Mode by pressing DONE and then the - key.

Note: If you cannot plug in the AC Adapter, entering Setup Mode makes sure the station isn't writing any data to memory when power is removed and avoids data loss.

2. Remove the battery cover located on the back of the console by pressing down on the two latches at the top of the cover.
3. Place the console face down on a flat, firm surface.
4. Insert a fingertip between the two exposed batteries then press the middle battery down toward the notch (toward the "hidden" battery). This will relieve tension on the first battery and allow you to remove it.
5. Remove the old batteries and install the new batteries.
6. Replace the battery cover and remove the AC power adapter, if used.
7. Check and set date and time if power was lost.

One Year Limited Warranty

For details on our warranty policy, please refer to the *Maintenance, Service, and Repair Information* brochure included with your station.

Appendix A
Weather Data

Refer to this appendix to learn more about the weather variables that are measured, displayed, and logged by your Vantage Pro2 Station. Some weather variables require optional sensors. See “Optional Sensors & Transmitting Stations” starting on page 2.

Wind

The anemometer measures wind speed and direction, and is part of the Integrated Sensor Suite (ISS). The console calculates a 10-minute average wind speed and 10-minute dominant wind direction. The 10-minute average wind speed is displayed in the console ticker whenever wind has been selected on the console. The last six 10-minute dominant wind directions are included in the compass rose wind display.

Temperature

The ISS houses the outside temperature sensor in a vented and shielded enclosure that minimizes the solar radiation induced temperature error. The console houses the inside temperature sensor. Additional temperature sensors are available for wireless stations and can measure up to eight locations.

Apparent Temperatures

Vantage Pro2 calculates three apparent temperature readings: Wind Chill, Heat Index, and the Temperature/Humidity/Sun/Wind (THSW) Index. Apparent temperatures use additional weather data to calculate what a human body perceives the temperature to be in those conditions.

Wind chill

Wind chill takes into account how the speed of the wind affects our perception of the air temperature. Our bodies warm the surrounding air molecules by transferring heat from the skin. If there’s no air movement, this insulating layer of warm air molecules stays next to the body and offers some protection from cooler air molecules. However, wind sweeps that warm air surrounding the body away. The faster the wind blows, the faster heat is carried away and the colder you feel. Wind has a warming effect at higher temperatures.

Note: Wind chill is not calculated above 92° F (33° C).

Heat Index

The Heat Index uses temperature and the relative humidity to determine how hot the air actually “feels.” When humidity is low, the apparent temperature will be lower than the air temperature, since perspiration evaporates rapidly to cool the body. However, when humidity is high (*i.e.*, the air is more saturated with water vapor) the apparent temperature “feels” higher than the actual air temperature, because perspiration evaporates more slowly.

Note: Heat Index is equal to the air temperature at or below 0° F (-18° C).

Temperature/Humidity/Sun/Wind (THSW) Index

The THSW Index uses humidity and temperature like for the Heat Index, but also includes the heating effects of sunshine and the cooling effects of wind (like wind chill) to calculate an apparent temperature of what it "feels" like out in the sun. The THSW Index requires a solar radiation sensor.

Humidity

Humidity itself simply refers to the amount of water vapor in the air. However, the total amount of water vapor that the air can contain varies with air temperature and pressure. Relative humidity takes into account these factors and offers a humidity reading which reflects the amount of water vapor in the air as a percentage of the amount the air is capable of holding. Relative humidity, therefore, is not actually a measure of the amount of water vapor in the air, but a ratio of the air's water vapor content to its capacity. When we use the term humidity in the manual and on the screen, we mean relative humidity.

It is important to realize that relative humidity changes with temperature, pressure, and water vapor content. A parcel of air with a capacity for 10 g of water vapor which contains 4 g of water vapor, the relative humidity would be 40%. Adding 2 g more water vapor (for a total of 6 g) would change the humidity to 60%. If that same parcel of air is then warmed so that it has a capacity for 20 g of water vapor, the relative humidity drops to 30% even though water vapor content does not change.

Relative humidity is an important factor in determining the amount of evaporation from plants and wet surfaces since warm air with low humidity has a large capacity to absorb extra water vapor.

Dew Point

Dew point is the temperature to which air must be cooled for saturation (100% relative humidity) to occur, providing there is no change in water vapor content. The dew point is an important measurement used to predict the formation of dew, frost, and fog. If dew point and temperature are close together in the late afternoon when the air begins to turn colder, fog is likely during the night. Dew point is also a good indicator of the air's actual water vapor content, unlike relative humidity, which takes the air's temperature into account. High dew point indicates high water vapor content; low dew point indicates low water vapor content. In addition a high dew point indicates a better chance of rain, severe thunderstorms, and tornados.

You can also use dew point to predict the minimum overnight temperature. Provided no new fronts are expected overnight and the afternoon relative humidity is greater than or equal to 50%, the afternoon's dew point gives you an idea of what minimum temperature to expect overnight, since the air can never get colder than the dew point. Dew point is equal to air temperature when humidity = 100%.

Rain

Vantage Pro2 incorporates a tipping-bucket rain collector in the ISS that measures 0.01" for each tip of the bucket. A metric adapter can be installed to measure 0.2 mm for each tip of the bucket.Your station logs rain data in the same units it is measured in and converts the logged totals into the selected display units (inches or millimeters) at

the time it is displayed. Converting at display time reduces possible compounded rounding errors over time.

Four separate variables track rain totals: “rain storm,” “daily rain,” “monthly rain,” and “yearly rain.” Rain rate calculations are based on the interval of time between each bucket tip, which is each 0.01" rainfall increment or 0.2 mm.

Barometric Pressure

The weight of the air that makes up our atmosphere exerts a pressure on the surface of the earth. This pressure is known as atmospheric pressure. Generally, the more air above an area, the higher the atmospheric pressure, this means that atmospheric pressure changes with altitude. For example, atmospheric pressure is greater at sea level than on a mountaintop. To compensate for this difference and facilitate comparison between locations with different altitudes, atmospheric pressure is generally adjusted to the equivalent sea level pressure. This adjusted pressure is known as barometric pressure. In reality, the Vantage Pro2 measures atmospheric pressure. When you enter your location’s altitude in Setup Mode, the Vantage Pro2 stores the necessary offset value to consistently translate atmospheric pressure into barometric pressure.

Barometric pressure also changes with local weather conditions, making barometric pressure an extremely important and useful weather forecasting tool. High pressure zones are generally associated with fair weather while low pressure zones are generally associated with poor weather. For forecasting purposes, however, the absolute barometric pressure value is generally less important than the change in barometric pressure. In general, rising pressure indicates improving weather conditions while falling pressure indicates deteriorating weather conditions.

Solar Radiation

What we call “current solar radiation” is technically known as Global Solar Radiation, a measure of the intensity of the sun’s radiation reaching a horizontal surface. This irradiance includes both the direct component from the sun and the reflected component from the rest of the sky. The solar radiation reading gives a measure of the amount of solar radiation hitting the solar radiation sensor at any given time, expressed in Watts/sq. meter (W/m^2). Solar radiation requires the solar radiation sensor.

UV (Ultra Violet) Radiation

Energy from the sun reaches the earth as visible, infrared, and ultraviolet (UV) rays. Exposure to UV rays can cause numerous health problems, such as sunburn, skin cancer, skin aging, cataracts, and can suppress the immune system. The Vantage Pro2 helps analyze the changing levels of UV radiation and can advise of situations where exposure is particularly unacceptable. UV radiation requires the UV radiation sensor. The Vantage Pro2 displays UV readings in two scales: MEDs and UV Index.

Note: Your station’s UV readings do not take into account UV reflected off snow, sand, or water, which can significantly increase your exposure. Nor do your UV readings take into account the dangers of prolonged UV exposure. The readings do not suggest that any amount of exposure is safe or healthful. Do not use the Vantage Pro2 to determine the amount of UV radiation to which you expose yourself. Scientific evidence suggests that UV exposure should be avoided and that even low UV doses can be harmful.

UV MEDs

MED (Minimum Erythemal Dose) is defined as the amount of sunlight exposure necessary to induce a barely perceptible redness of the skin within 24 hours after sun exposure. In other words, exposure to 1 MED will result in a reddening of the skin. Because different skin types burn at different rates, 1 MED for persons with very dark skin is different from 1 MED for persons with very light skin.

Both the U.S. Environmental Protection Agency (EPA) and Environment Canada have developed skin type categories correlating characteristics of skin with rates of sunburn.

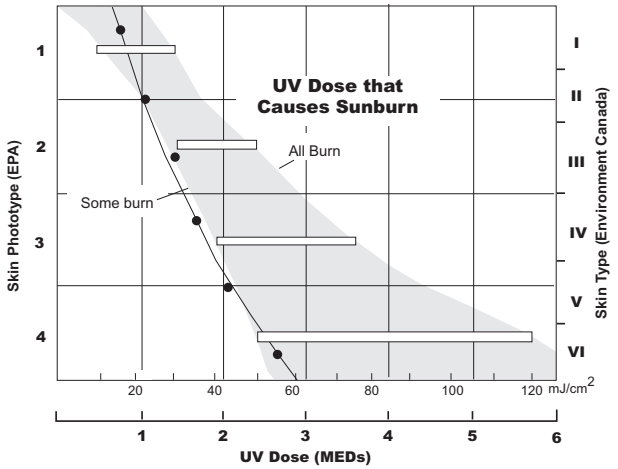
TABLE A-1: EPA SKIN PHOTOTYPES

Skin Phototype	Skin Color	Tanning & Sunburn history
1 - Never tans, always burns	Pale or milky white; alabaster	Develops red sunburn; painful swelling, skin peels
2 - Sometimes tans, usually burns	Very light brown; sometimes freckles	Usually burns, pinkish or red coloring appears; can gradually develop light brown tan
3 - Usually tans, sometimes burns	Light tan; brown, or olive; distinctly pigmented	Rarely burns; shows moderately rapid tanning response
4 - Always tans; rarely burns	Brown, dark brown, or black	Rarely burns; shows very rapid tanning response

TABLE A-2: ENVIRONMENT CANADA SKIN TYPES AND REACTION TO THE SUN[A]

Skin Type	Skin Color	History of Tanning & Sunburning
I	White	Always burns easily, never tans
II	White	Always burns easily, tans minimally
III	Light Brown	Burns moderately, tans gradually
IV	Moderate Brown	Burns minimally, tans well
V	Dark Brown	Burns rarely, tans profusely
VI	Black	Never burns, deep pigmentation

a. Developed by T. B. Fitzpatrick of the Harvard Medical School. More about the Fitzpatrick Skin Types is available in: Fitzpatrick TB. Editorial: the validity and practicality of sun-reactive skin types I through VI. Arch Dermatol 1988; 124:869-871



UV Dose and Sunburn - Use this plot to estimate the MED dose leading to sunburn. A person with Type II (Environment Canada) skin type might choose 0.75 MED as the maximum for the day; in contrast, a person with Type V (Environment Canada) Skin Type might consider 2.5 MEDs a reasonable dose for the day. NOTE: the Vantage Pro2 assumes a Fitzpatrick (Environment Canada) Skin Type of II.

UV Index

Vantage Pro2 can also display UV Index, an intensity measurement first defined by Environment Canada and since been adopted by the World Meteorological Organization. UV Index assigns a number between 0 and 16 to the current UV intensity. The US EPA categorizes the Index values as shown in table A-3. The lower the number, the lower the danger of sunburn. The Index value published by the U.S. National Weather Service is a forecast of the next day's noontime UV intensity. The index values displayed by the Vantage Pro2 are real-time measurements.

TABLE A-3: UV INDEX

Index Values	Exposure Category
0 - 2	Low
3 - 4	Moderate
5 - 6	High
7 - 9	Very High
10+	Extreme

Evapotranspiration (ET)

Evapotranspiration (ET) is a measurement of the amount of water vapor returned to the air in a given area. It combines the amount of water vapor returned through evaporation (from wet surfaces) with the amount of water vapor returned through transpiration (exhaling of moisture through plant stomata) to arrive at a total. Effectively, ET is the opposite of rainfall, and it is expressed in the same units of measure (inches, millimeters).

The Vantage Pro2 uses air temperature, relative humidity, average wind speed, and solar radiation data to estimate ET, which is calculated once an hour on the hour. ET requires the optional solar radiation sensor.

Leaf Wetness

Leaf wetness (see "Optional Sensors & Transmitting Stations" on page 2) provides an indication of whether the surface of foliage in the area is wet or dry by indicating how wet the surface of the sensor is. The leaf wetness reading ranges from 0 (dry) to 15. Leaf wetness requires an optional Leaf & Soil Moisture/Temperature Station and is only available for Wireless Vantage Pro2 Stations.

Soil Moisture

Soil Moisture, as the name suggests, is a measure of the moisture content of the soil. Soil moisture is measured on a scale of 0 to 200 centibars, and can help choose times to water crops. The soil moisture sensor measures the vacuum created in the soil by the lack of moisture. A high soil moisture reading indicates dryer soil; a lower soil moisture reading means wetter soil. Soil Moisture requires an optional Leaf & Soil Moisture/Temperature Station or Soil Moisture Station and is only available for Wireless Vantage Pro2 Stations.

Time

The console has a built-in clock and calendar track the time and date. It automatically adjusts for daylight saving time in most of North America and Europe (and allows manual adjustment elsewhere) and for leap years, providing you have entered the correct year, latitude and longitude, and daylight saving settings in the Setup Mode.

Appendix B
Specifications

See complete specifications for your Vantage Pro2 Station at our website: www.davisnet.com.

Console Specifications

Console Operating Temperature	+32° to +140°F (0° to +60°C)
Non-operating Temperature	+14° to +158°F (-10° to +70°C)
Console Current Draw	Wireless: 0.9 mA average, 30 mA peak, (add 120 mA for display lamps, add 0.125 mA for each optional transmitter station received by console) at 4 to 6 VDC Cabled: 10 mA (average), 15 mA (peak) (+80 mA for illuminated display) at 4 to 6 VDC
Power Adapter	5 VDC, 300 mA, regulated
Battery Backup	3 C-cells
Battery Life (no AC power)	Wireless: up to 9 months; (Cabled: approximately 1 month)
Connectors	Modular RJ-11
Housing Material	UV-resistant ABS plastic
Console Display Type	LCD Transflective
Display Backlight	LEDs
Dimensions:	
Console (with antenna)	10.625" x 6.125" x 1.625" (270 mm x 156 mm x 41 mm)
Console (no antenna)	9.625" x 6.125" x 1.625" (244 mm x 156 mm x 41 mm)
Display	5.94" x 3.375" (151 mm x 86 mm)
Weight (with batteries)	1.88 lbs. (.85 kg)

Wireless Communication Specifications

Transmit/Receive Frequency	
US Models:	902 - 928 MHz FHSS
Overseas Models:	868.0 - 868.6 MHz FHSS
ID Codes Available	8
Output Power	902 - 928 MHz FHSS: FCC-certified low power, less than 8 mW, no license required 868.0 -868.6 MHz: CE-certified, less than 8 mW, no license required
Range	
Line of Sight	up to 1000 feet (300 m)
Through Walls	200 to 400 feet (75 to 120 m)

Console Data Display Specifications

Historical Data	Includes the past 24 values listed unless otherwise noted; all can be cleared and all totals reset.
Daily Data	Includes the earliest time of occurrence of highs and lows; period begins/ends at 12:00 am.
Monthly Data	Period begins/ends at 12:00 am on the first of every month.
Yearly Data	Period begins/ends at 12:00 am on January 1st unless otherwise noted.
Current Graph Data	Current data appears in the right most column in the console graph and represents the latest value within the last period of the graph; totals can be set or reset.
Graph Time Interval	1 min., 10 min., 15 min., 1 hour, 1 day, 1 month, 1 year (user-selectable, availability depends upon variable selected).
Graph Time Span	24 Intervals + Current Interval (see Graph Intervals to determine time span).
Graph Variable Span (Vertical Scale)	Automatic (varies depending upon data range); maximum and minimum value in range appear in ticker.
Alarm Indication	Alarms sound for 2 minutes (time alarm is 1 minute) if operating on battery power. Alarm message displays in ticker as long as threshold is met or exceeded. Alarms can be silenced, but not cleared, by pressing DONE.
Transmission Interval	Varies with transmitter ID code - from 2.25 seconds (ID1 = shortest) to 3 seconds (ID8 = longest).
Update Interval	Varies with sensor - see individual sensor specs.

Forecast:

Variables Used	Barometric reading & trend, wind speed & direction, rainfall, temperature, humidity, latitude & longitude, time of year.
Update Interval	1 hour
Display Format	Icons on top center of display; detailed message in ticker at bottom.
Variables Predicted	Sky condition, precipitation, temperature changes, wind direction and speed changes.

Weather Data Specifications

Note: These specifications include optional sensors that may not be installed in your Vantage Pro2 Station.

Weather Data Specifications

Variable	Required Sensors	Resolution	Range	Nominal Accuracy (+/-)
Barometric Pressure*	Included in Console	0.01" Hg; 0.1 mm; 0.1 hPa; 0.1 mb	16" to 32.5" Hg 410 to 820 mm 540 to 1100 hPa 540 to 1100 mb**	0.03" Hg 0.8 mm Hg 1.0 hPa 1.0 mb
Barometric Trend (3 hour)		Change Rates Rapidly: ≥.06" Hg 1.5 mm Hg 2 hPa, 2 mb; Slowly: ≥.02" Hg 0.5 mm Hg 0.7 hPa, 0.7 mb	5 Arrow Positions: Rising Rapidly Rising Slowly Steady Falling Slowly Falling Rapidly	
Evapotranspiration (ET)	ISS or Temp/ Hum Station & Solar Radiation sensor	0.01"; 0.1 mm	Daily to 32.67"; 832.1 mm Monthly & Yearly to 199.99"; 1999.9 mm	greater of 5% or 0.01"; 0.25 mm
Inside Humidity	Included in Console	1%	1 to 100%	3% RH; 4% above 90%
Outside Humidity	ISS or Temp/ Hum Station	1%	1 to 100%	3% RH; 4% above 90%
Extra Humidity	ISS or Temp/ Hum Station	1%	1 to 100%	3% RH; 4% above 90%
Dew Point (overall)	ISS or Temp/ Hum Station	1°F; 1°C	-105° to +130°F; -76° to +54°C	3°F; 1.5°C
Leaf Wetness	Leaf & Soil Station	1	0 to 15	0.5
Soil Moisture	Leaf & Soil Station or Soil Moisture Station	1 cb	0 to 200 cb	
Daily & Storm Rainfall	Rain Collector	0.01"; 0.2 mm	to 99.99"; 999.8 mm	greater of 4% or 1 tip,
Monthly & Yearly Rainfall		0.01"; 0.2 mm (1mm at totals over 2000 mm)	to 199.99"; 6553 mm	greater of 4% or 1 tip
Rain Rate		0.01"; 0.2 mm	to 96"/hr.; 2438 mm/hr.	greater of 5% or 0.04"/hr.; 1 mm/hr.

*Barometric pressure readings are standardized to sea level. Elevation Range: -999' to +15,000'; -600 to + 4570 m. Note: The console screen limits display of lower elevation to -999' when using feet as elevation unit. For elevations lower than -999', use meters.

**This is the reduced value after standardizing to sea level.

Weather Data Specifications

Variable	Required Sensors	Resolution	Range	Nominal Accuracy (+/-)
Solar Radiation	Solar sensor	1 W/m^2	0 to 1800 W/m^2	5% of full scale
Inside Temperature	Included in Console	0.1°F; 0.1°C	+32° to +140°F; 0 to +60°C	1°F; 0.5°C
Outside Temperature***	ISS, Temp Station or Temp Hum Station	0.1°F; 0.1°C	-40° to +150°F; -40° to +65°C	1°F; 0.5°C
Extra Temperature	ISS, Temp Station, Temp Hum Station, Leaf Soil Station or Soil Station	1°F; 1°C	-40° to +150°F -40° to +65°C	1°F; 0.5°C
Heat Index	ISS or Temp/ Hum Station	1°F; 1°C	-40° to +165°F; -40° to +74° C	3°F (1.5°C)
Temp-Hum-Sun-Wind index (THSW)	ISS & Solar Radiation	1°F; 1°C	-90° to +165°F; -68° to +74° C	4°F (2°C)
Time	Included in Console	1 min	24 hours	8 sec./mon.
Date		1 day	month/day	8 sec./mon.
UV Index	UV Radiation	0.1 Index	0 to 16	5% of full scale
UV Dose		0.1 MED < 20, 1 MED > 20	0 to 199 MEDs	5%
Wind Direction	Anemometer	1°	0 to 360°	3°
Compass Rose		22.5°	16 compass pts	0.3 compass pt
Wind Speed (large cups)		1 mph; 1 kt; 0.4 m/ s; 1 km/h	2 to 180 mph; 2 to 156 kts 3 to 290 km/h, 1 to 80 m/s	greater of 2 mph/kts; 1 m/s; 3 km/h or 5%
Wind Chill	ISS	1°F; 1°C	-110° to +135°F -79° to +57°C	2°F;1°C

***Outside temperature accuracy is based on the temperature sensor itself and not on the sensor and the passive shielding together. The solar radiation induced error for standard ration shield: +4°F (2°C) at solar noon; for fan aspirated radiation shield: +0.6°F (0.3°C) at solar noon (insolation = 1040 W/m^2, avg. wind speed ≤ 2 mph (1 m/s), reference: RM Young Model 43408 Fan-Aspirated Radiation Shield).

Appendix C
Wireless Repeater Configuration

A Vantage Pro2 Wireless Repeater (#7626, #7627) or Long-Range Wireless Repeater (#7653, #7654) increase transmission distances or improve transmission quality between a station and a console. A repeater receives information transmitted from a Vantage Pro2 station and retransmits it to a console. Depending on transmission distance, one repeater or several repeaters can be used to collect and retransmit weather data.

All consoles communicating with repeaters must be set up with the correct Transmitter ID and Repeater ID before the console can correctly receive station information.

To set Repeater ID on the console:

1. Press DONE and the - keys to enter Setup Mode.
2. If Setup Mode has previously been completed, press DONE to display Screen 2: Configuring Transmitter IDs.
3. See “Screen 2: Configuring Transmitter IDs — Wireless Only” on page 10 for more information on configuring Transmitter IDs.
4. Press 2ND and then press WIND to enter Repeater Setup Mode and to select a Repeater ID. Pressing 2ND and WIND sets the console to receive the signal from a repeater instead of directly from a station. Once the console is in the repeater setup mode, subsequent pressing of WIND continue to cycle through the all the repeater IDs.
5. Press WIND repeatedly to cycle through all eight repeater IDs possible or to clear the repeater ID in the right hand corner. When no repeater ID is shown, the console is configured to listen directly to a station and not to a repeater.

   In the example below, the console is set up to receive an ISS station on transmitter ID 1 from repeater A.

6. For each station using a repeater, select the station and turn on the repeater function and select the correct repeater ID.
7. Press DONE to continue to the other screens in the Setup Mode, or press and hold DONE to return to the Current Weather Mode.

Note: In console with the October 2005 version of firmware, the only way to exit Repeater Setup mode is to press DONE to continue to the next setup screen.

Verifying Setup

To verify that you have successfully set up your console to receive a repeater in the console’s Current Weather Mode:

1. View the transmitter information displaying at the bottom of the console screen.

If the transmitter ID being repeated is displayed and an “X” flashes in the bottom right corner of the ticker tape, the transmitter is being repeated and received by the console successfully.

The repeater’s information also displays at the bottom of the console’s diagnostics screens.

Clearing Repeater ID

If a repeater ID is being displayed in Screen 2 and you are not using a repeater with the selected station, you must turn off the repeater function to receive station information successfully.

In Setup Screen 2:

Press 2ND and then press WIND repeatedly so that the console cycles through the list of repeater IDs (Repeaters A-H) until the section where the repeater ID was displayed is blank. Press DONE to continue to the next screen or press and hold DONE to return to the Current Weather Mode.

Vantage Pro2 Console Icons

Console icons indicate weather conditions and special functions.

Forecast

Indicates the weather forecast for the next 12 hours.

Moon Phase

Shows the current moon phase. Sequence shown for Northern Hemisphere. The sequence of the icons is reversed in the Southern Hemisphere.

Alarm Bell

Flashes when an alarm is triggered. Also indicates when the console is in Alarm Mode.

Graph

Appears next to the currently selected weather variable. Also indicates the graphed variable on most screens.

Second Function

Appears when you press 2ND key. Indicates that console key secondary functions are enabled.

Rain

Appears when the console is currently detecting rain.

Barometric Pressure Trend

Arrows show direction of pressure change for last three hours.

Contacting Davis Technical Support

For questions about installing or operating your Vantage Pro2 weather station, please contact Davis Technical Support. We'll be glad to help.

(510) 732-7814 — Monday - Friday, 7:00 a.m. - 5:30 p.m. Pacific Time. We are unable to accept collect calls.

(510) 670-0589 — Technical Support Fax.

support@davisnet.com — E-mail to Technical Support.

info@davisnet.com — General e-mail.

www.davisnet.com — Davis Instruments web site. See the Weather Support section for copies of user manuals, product specifications, application notes, and information on software updates. Watch for FAQs and other updates.